THE FINANCING OF THE PRODUCTIVE SERVICE THROUGH HCC

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Abstract
The use of HCC in areas of acquisition, utilization, and preservation of human capital. Economic effects of such sectors – acceleration of professional fulfillment, better professional performance, longer zenith and horizon of productive fulfillment. Proposal and substantiation of the HCC based on the transferred price to ensure that economic effects through the relevant mechanisms (and not on the basis of the institutional system entities) serve as the source of financing for the entities that contributed to them and are distributed based on the contribution of such entities to the achievement thereof. A transferred price is a contract, where a productive service recipient makes payments based on the potential benefits accrued as a result of the productive service and based on the amount of returns generated from the productive service – directly to the productive service provider. Effects of some productive services only materialize in the form of longer horizon of productive fulfillment.

Key words: *human capital contracts, transferred price, productive service*

1. INTRODUCTION

The idea of financing one of the forms of productive services – tertiary education – in the form of HCC (human capital contracts) was first formulated in 1955 by M. Friedman The Role of Government in Education (1955), even before he wrote A Theory of the Consumption Function (1957), where Friedman formulated the idea of productive consumption – i.e. consumption enabling the acquisition and preservation of human capital.

Since the 1960s, we have seen many attempts of applying the aforementioned idea in practice, in different variations and with different results. For a long time, the Australian HECS system seemed to be the most successful of those attempts; the US MyRichUncle system also looked promising. Many specialized papers came into existence in connection with the design, improvement, and analysis of functioning of these systems, whereas the most significant works in terms of theory are those of N. Barr (2012), B. Johnston (1972, 1986, 2006), M. Palacios (2004), H. Vossensteyn (2005, 2009). The last researcher considerably clarified the term "HCC" and also tried to expand its application to the area of healthcare financing. In terms of the Czech Republic, mainly the following people are engaged in theoretical research of the given area: P. Matějů (2003, 2005), V. Urbánek (2007). The problems of HCC-based systems show that it is necessary to proceed significantly further in the theoretical analysis and modeling of HCC.

The following article was created by the team that has already successfully resolved three related projects of Czech Science Foundation – Efficiency of investments in human capital (2003-2005), Investments in social capital and efficiency (2006-2008), and Theory of redistribution systems (2009-2011).

In a way (in the form of searching for a primary theoretical model), the area is also studied by important Czech teams concentrated around R. Richta (particularly in the 1960s), Y. Strecková (particularly in the 1980s), and M. Potůček (present), who focused on the role of human potential in economic processes.

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Theoretical conclusions are compared with the results of international research of adults OECD PIAAC and international research SHARE.

Compared to existing approaches:

- We clarify the HCC in question (the principle of transferred price play the key role in this regard).

- We expand the application of the HCC to the area of conveyed application of transferred price (i.e. in areas, where the effects of productive services become apparent by longer horizon of productive fulfillment, for example).

- We corroborate the relationship with the perspective trend of economic development associated with the growing role of productive services aimed at acquisition, utilization, and preservation of human capital.

- We create general model of the said type of the HCC, which will make it possible to create feedback between economic effects (and assessment of such effects on different markets) of all types of productive services and their financing (or to verify the hypothesis of whether this is a sufficiently general principle).

- Based on the HCC model and improvement of the data analysis methods, we assess, significantly more accurately, the effects of productive services (particularly in the area of education and health).

In the article we define the basic characteristics of HCC based on transferred price and show its importance for the increased role of the productive service sector. Consecutively we show the effects of productive services grow on economic grow.

2. HCC BASED AND THE TRANSFERRED PRICE

It is possible to use HCC in sectors related to acquisition, utilization and preservation of human capital. These sectors comprise, in particular, education and healthcare, but they may also include family upbringing, provision of housing for young families, culture, some areas of relaxation and recreational activities, spa industry, professional (work-related) consulting, etc. Economic effects accrued in the aforementioned sectors are in the form of quicker professional fulfillment, better professional results, as well as longer zenith and horizon of productive fulfillment; see the following chart:

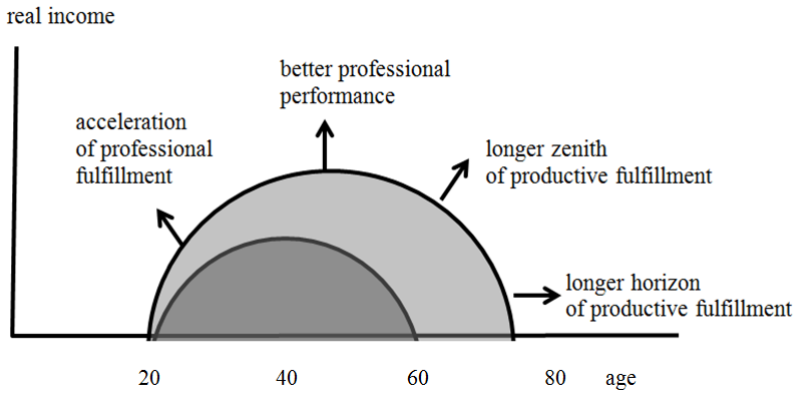


Figure 1: The Economic Effects of Productive Services

(Source: Valenčík)

A general HCC model (subsequently specified for individual areas of productive services) based on a transferred price and conveyed application of transferred price (see below) enables to show, how economic effects in particular sectors are created. The effects arise through mechanisms and not through decisions of various entities operating in the institutional systems. The effects serve as the source of financing for entities which contributed to them (i.e. providers, users and mediators of

productive services). The financing is distributed according to the contribution of these entities to the achievement of these effects. A transferred price is a contract, where a productive service recipient makes payments based on the potential benefits accrued as a result of the productive service and based on the amount of returns generated from the productive service; such payments are made directly to the productive service provider. It allows risk diversification, together with the financing of investments in human capital from future returns. It may be used to finance, for example, university education, as well as initial housing for young families or immigrants.

The term transferred price is based on the fact that valuation from another market (such as from the market of professional fulfilment) and form another time period is transferred to the area of human capital contracts. It generalizes the concept of price in terms of mutual interconnection of individual markets.

Effects of some productive services only become apparent in the area of longer zenith and, in particular, horizon of productive fulfillment. In this case, we talk about the conveyed use/application of transferred price, because the precondition for assessing such effects is the functioning of insurance markets or pension insurance/health insurance market, as appropriate.

Therefore, the definition and the settings of the mechanisms that make it possible to create the feedback between the economic effects of productive services and the financing of those, who contributed to such effects, also assume, among others, a fully contribution-based system of pension insurance. Confrontation of the model with empirical data (PIAAC, SHARE) relies on the models of H. Grossman (1972) and G. Becker (1993) for human capital valuation. Based on the theory of demand after health, we are able to define two basic types of human behavior in terms of healthy lifestyle:

- active, effective, and rational behavior of an investor type, consisting in the prevention of illnesses by promoting one's health;

- passive, ineffective, behavior of people with lower rationality (consumer).

The conveyed application of transferred price would motivate people to behave rationally.

The theoretical objective of the project is to verify the hypothesis that it is possible to define a mechanism for each area of productive services that would be based on general rules and enable the provision of financing for such services via the HCC on the basis of the transferred price principle or conveyed application of transferred price. In order to verify the given hypothesis, it is necessary to:

1. Specify the definition of the term "transferred price" and "conveyed application of transferred price"; consequently, describe – on the basis of a model – its nature to ensure that individual cases of its application rely on a common foundation.

2. Classify in detail individual types of productive services that allow the acquisition, utilization, and preservation of human capital; specify, for each of these types, some type of transferred price or conveyed application of transferred price that would enable the financing of the relevant productive service from its returns.

The practical objective of the project is to formulate theoretical bases of the basic concept of interconnected reforms in the area of social investments and social insurance (financing of education, healthcare, and pension insurance).

The concept of „economy based on productive services" is used in a similar sense as the concept of „knowledge society". We consider it more accurate for several reasons:

- It is more complex as it refers to education as well as to other attributes of human capital. And it is not only about the way of acquiring them but also of maintaining and applying them.

- It indirectly demonstrates that in order to be able to comprehend this economic system our society is directed at, we will need a micro-economic theory which exceeds the boundaries of the neo-classical economics. It does not take into account the productive (source-related) nature of the consumption.

In this context, I find it important to stress the substantial difference of the proposed approach from the R. Inglehart´s concept about a society based on "non-material" needs presented in his work called „The Silent Revolution“ from 1977. Although the Inglehart´s concept might seem quite attractive and most popular at his time, there is one fundamental flaw. It does not deal with a specific idea as to how the satisfaction of "non-material needs" can change in a crucial factor of "material" economic growth. R. Inglehart does not even imagine a thing like this could be possible. Therefore, he cannot even create a concept of economic system where strengthening the role of "non-material needs" could – figuratively speaking – pay its way in order to compete with other tendencies within the social development.

In this area a long time ago, K. Marx developed this idea much further in his manuscript "Grundrisse" (1857-61) when he writes: *„Real economy – saving – consists of the saving of labour time (minimum (and minimization) of production costs); but this saving identical with development of the productive force. Hence in no way abstinence from consumption, but rather the development of power, of capabilities of production, and hence both of the capabilities as well as the means of consumption. The capability to consume is a condition of consumption, hence its primary means, and this capability is the development of an individual potential, a force of production. The saving of labour time [is] equal to an increase of free time, i.e. time for the full development of the individual, which in turn reacts back upon the productive power of labour as itself the greatest productive power. From the standpoint of the direct production process it can be regarded as the production of fixed capital, this fixed capital being man himself. It goes without saying, by the way, that direct labour time itself cannot remain in the abstract antithesis to free time in which it appears from the perspective of bourgeois economy.“* (Marx 1974, p. 343, Marx online en 2002, p. 643)

R. Richta (and an Interdisciplinary Research Team) also progressed further with his famous work (highly regarded all over the world and published in many languages) Civilization at the Ccrossroads; social and human implications of the scientific and technological revolution (1969).

The fact that the needs in question (we call them "faculty needs", i. e. needs related to developing, maintaining and applying skills), are to "pay their way" is justified in terms of the existence of position investment, investment in social position which turns property advantage into privilege. It is the enhanced influence of the position investment in the last decades that results in suppressing optimistic trends that are mentioned by R. Inglehart in his work.

3. SECTOR OF PRODUCTIVE SERVICES AND A NEW TYPE OF ECONOMIC GROWTH

The most common cause of current problems is the fact that the present steady development has not been reoriented towards a society of productive services, i.e. a society where the economic core is represented by productive services related to acquiring, maintaining and applying the human capital. The economic growth can be exponentially dynamic as well as sustainable, or precisely speaking it has to be exponentially dynamic to be sustainable. The foundation of this type of growth stands for productive services. A crucial condition for the transition to the economy of productive services is the motivation of entities that are involved in the area of productive services related to acquiring, maintaining and applying the human capital; the creation of the feedback between the effects of productive services and the funding of these subjects can substantially contribute to higher dynamics of the economic growth, positive changes of its nature and to enhanced quality of people. In order to implement the new economy, i.e. the economy of productive services, it is necessary to have a complex of interconnected reforms in the sectors of social investment and social insurance (especially education, health care and pension schemes).

The timely theoretical preparation of the reforms in the area of the social investments/social insurance systems as well as the subsequent implementation of such reforms are crucial for further crisis-free/conflict-free development of the society, which assumes significantly higher role of productive services as the center of gravity of such economic growth that may be increasingly dynamic as well as sustainable.

The inability to come up with a realistic idea about the possibility of exponentially dynamic sustainable growth is epistemological cause of evoking and spreading visions about catastrophic or enforced dealing with problems associated with the existence of insuperable obstacles of the growth (through consumption regulation, population number limits etc.). These visions subsequently enhance the intensity of position investment that results in economic segregation and weakening of the institutional system of the society by activities of structures that protect one another when breaching generally accepted principles. It subsequently leads to bending reforms in the areas of social investment and social insurance, exploiting their objective indispensability to activities harming the society. For this reason, we are going to focus on creating a vision about the possibility of exponentially dynamic and sustainable economic growth based on the role of the sector of productive services.

The economy based on productive services allows economic growth that can be (in a simplified way) described as exponentially dynamic as well as sustainable. In other words – a transition to the economy based on productive services allows dynamic growth. There is no need for consumption regulation or struggle for sources; it involves the change in consumption manner. It is about satisfying needs associated with developing, maintaining and applying human skills, i.e. satisfying needs that subsequently affect the economic growth as the most significant productive force.

The following set of figures will try to specify the vision about the possibility of such growth and to present it in the context of the industrial revolution that allowed the exponentially dynamic growth in a similar way as the current transition to the economy based on productive services.

It is not easy to imagine how the growth could be exponentially dynamic (in terms of the average of the same proportional gains in a long-time time horizon to a gradually increasing base) and sustainable at the same time. The Fugure 2 compares the alternative of continuing exponentially dynamic growth (a dashed line graph) with the alternative of degressive growth limited by sources and consumption restriction (a dotted line graph).

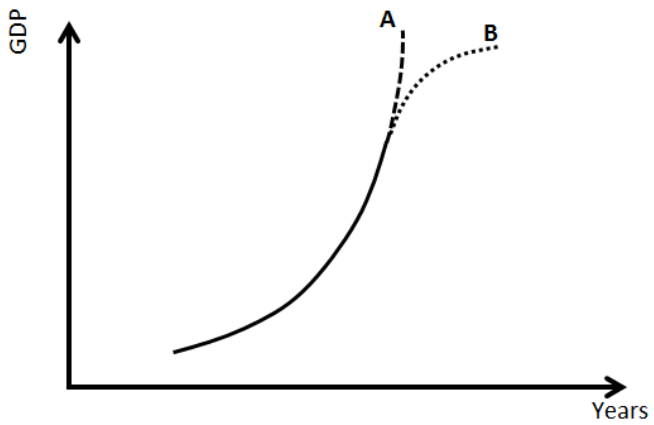


Figure 2: The alternatives to the Growth

(Source: Valenčík)

Note: During discussions at various expert forums we were presented with major opinion indicating that sooner or later it will not be possible to continue growth that would demonstrate exponential dynamic. We are going to reveal that such growth is possible and the shift of this dynamics already occurred in the past.

On the one hand it implies that no steady growth can be both exponentially dynamic and sustainable. On the other hand, however, it implies that the economic growth that is not steady and the nature of which changes can be both exponentially dynamic and sustainable.

Let´s focus on the example of industrial revolution. First, we are going to use a very simple scheme and afterwards a more detailed scheme based on the analysis of real data.

The Figure 3 presents a situation where the economy is based on the old sector (agriculture in the respective case) and a new sector is included in the initial phase (e.g. a new industry represented by craft). If the growth is of steady nature, then most production is ensured by the old sector (e.g. agriculture). Accordingly, production of the new sector production is increased as well. Enhancement of the old sector production, however, often runs into natural obstacles that restrict the growth (in that case a limited soil reserve with restricted productivity of the soil).

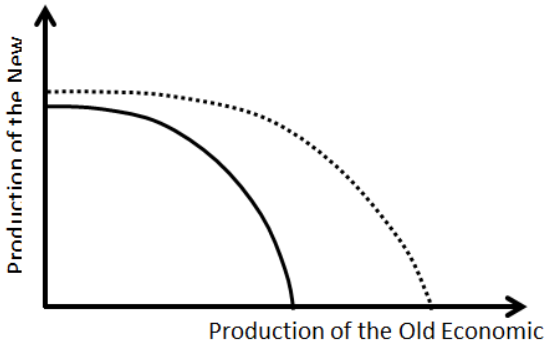


Figure 3: The Economy Based on the Old Economic Sector

(Source: Valenčík)

The economic revolution consists in expanding the new sector (e.g. craft turning into industry), it becomes the most dynamic, the core of the new type growth moves there, which subsequently allows enhancing the productivity of the old sector as well (in agriculture in the respective case). Restrictions that used to affect the old sector are overcome through innovations produced in the new sector. See Figure 4:

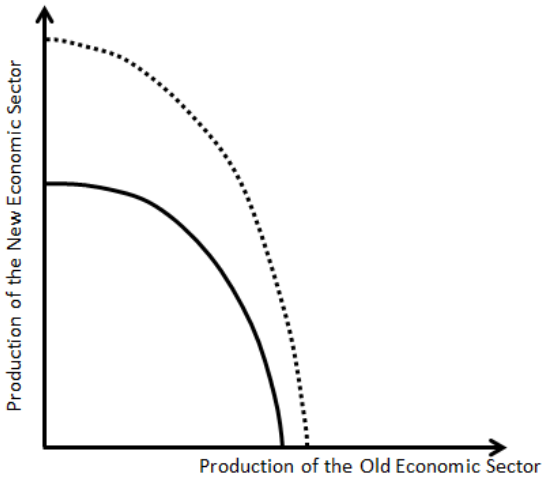


Figure 4: The Economy Based on the New Economic Sector

(Source: Valenčík)

However, the aforementioned scheme can be used for describing smaller changes in the economy related to spreading innovation waves. Let´s focus on the economy that is based on industrial revolution, however, it has not included electronics yet:

- Old sector = nearly the whole industrial economy.

- New sector = initial phase of logistic elements of the mechanical type (from the Prague astronomical clock, Watt regulator to analog computers controlling gunfire of ship guns).

Technological development (from the invention of relay, electron valve, transistor, integrated circuit to the microchip) allows massive (then hardly to imagine) expansion of logistic elements in economy, the launch of microelectronic logistics offering new possibilities for economic growth:

- Input savings (space, time, energy).

- Achieving technological parameters that were unthinkable before (precision, operating technology without direct human involvement, not only during space exploration).

- Generating new human needs that can be fulfilled by logistics based on microelectronics.

This way we could also describe innovation waves related to biotechnologies, laser technology etc.

The abovementioned scheme is most significant for demonstrating a crucial change affecting us nowadays: transition to economy based on productive services, i.e. services related to acquiring, maintaining and applying human capital. Here, the basic condition does not have to be technological but system-based:

- Development of relevant products of financial markets that would allow feedback between economic effects of productive services and funding these services.

- Breaking through barriers working against natural orientation of the society towards a higher level of equal opportunities.

The following Figure 5 depicts the development of labour productivity from the beginning of our era:

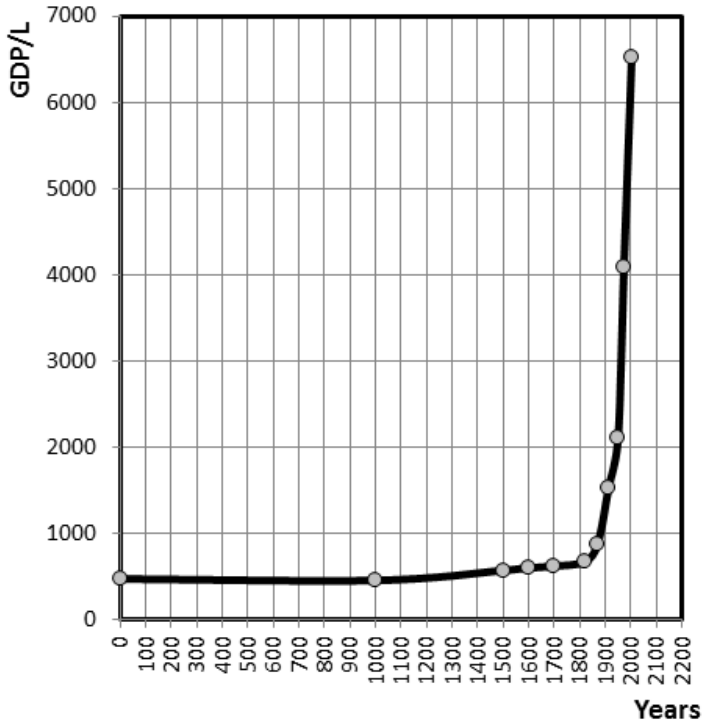


Figure 5: The Development of Labour Productivity from the Beginning of Our Era

(Source: Mihola)

We can see that G(HDP/L), (i.e. rate of growth per labour unit), starts to increase markedly in the initial phase of the industrial revolution and keeps growing to this day. However, its growth is decreasing and shall stabilize at the average interannual rate of 1.4 %:

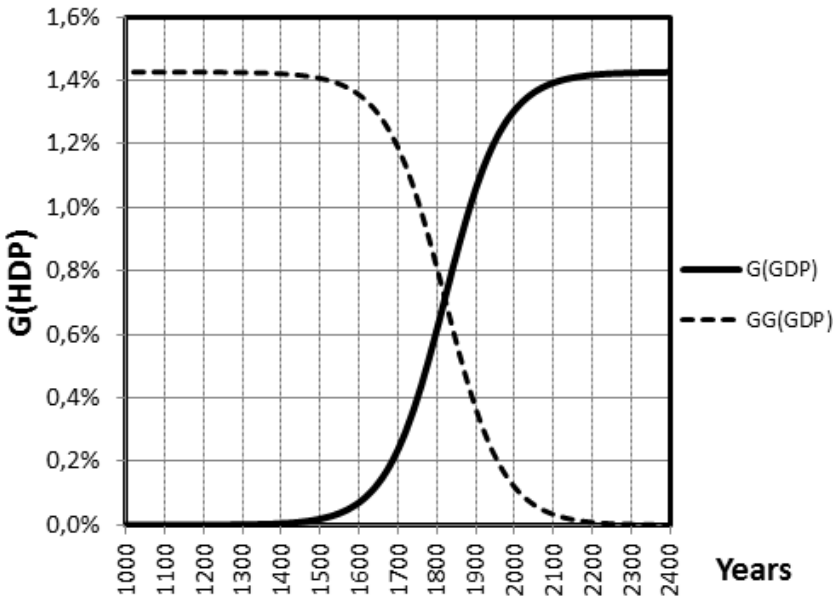


Figure 6: The Rate of Growth per Labour Unit

(Source: Mihola)

The transition to economy based on productive services can launch a similar process. Not only does the economic growth have an exponential nature from a long-term perspective, but it is actually faster. At a certain period the exponential dynamics of this growth started to accelerate and stabilized (so far) on exponential growth that corresponds to the average interannual rate of 1.4 % of rate of growth per labour unit (i.e. absolute growth is higher as a result of labour reserve gain). This increase in the rate of growth, well-described in graph 7 presenting the increase of average long-term gains, occurs during the industrial revolution. Throughout the industrial revolution, the respective dynamics is slightly increasing. Rather than to expect the rate of growth to decrease, we are more likely to experience similar increase as the one during the industrial revolution when the change of the economic growth character causes increase in its interannual dynamics from the present 1.4 % to a higher number as indicated by the following Figure 7:

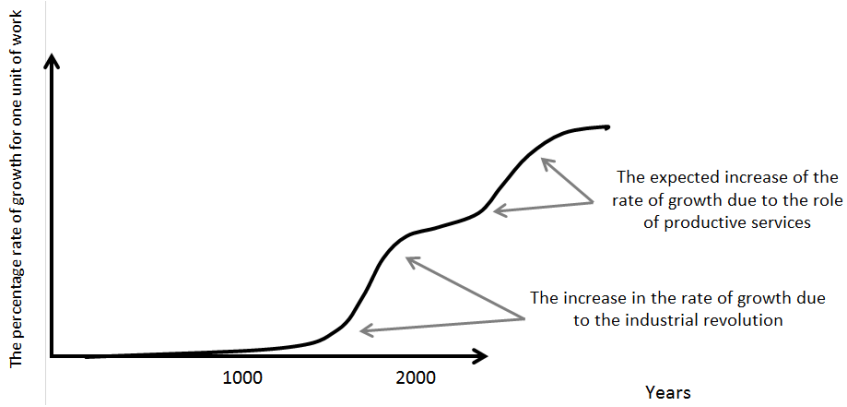


Figure 7: The transition to the Economy Based on Productive Services

(Source: Valenčík)

Another analysis presents intensive factors of growth entering the economy during the industrial revolution. First, there was room for capital accumulation (which was not the intensive factor of growth yet), only then did the capital accumulation provide room for applying innovations related to technical progress.

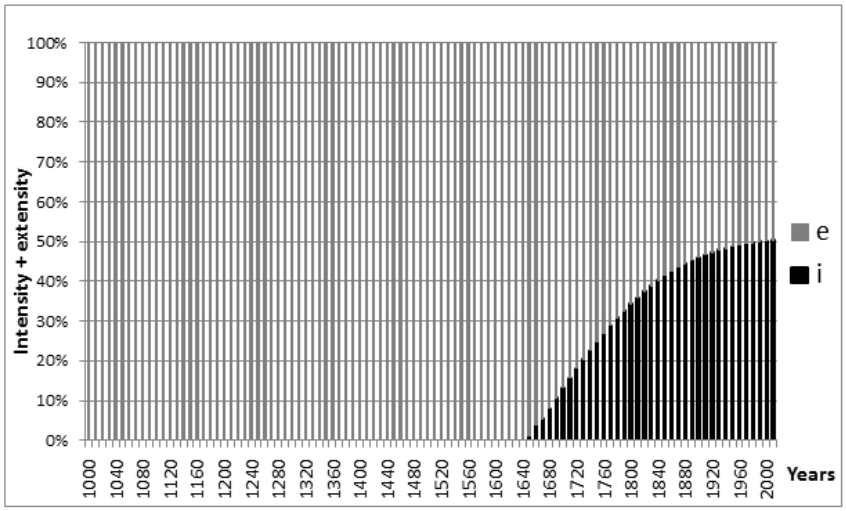


Figure 8: The Intensive factors of Growth Entering the Economy during the Industrial Revolution

(Source: Mihola)

Intensive factors stand for all positive changes as against the expansion of production solely based on expanding the production scope. The basic circle provides innovations of all kinds supported by patents and inventions i.e. by the development of science and knowledge in the broadest sense of the word. The intensive factors also include numerous improvements such as better work organization, more efficient management, effective motivation and marketing etc.

The growth in influence of intensive factors depends on the level of human capital. The key elements are utilization and development of those primary human skills possessed by all individuals. This complex of skills and faculties is always individual and original for every individual, however, it is possible to find a job that can be the most suitable for this person. Therein lies the biggest present reserve of society development.

The dynamic parameter of intensity is determined by the relationship and the dynamic parameter of extensity is determined by the expression, where G(SIF) is the rate of growth of the total input factor and G(SPF) is the rate of growth of the total productivity factors.

The dynamic parameter of intensity expresses the portion of intensive factors influence, whereas the dynamic parameter of extensity expresses the portion of extensive factors influence. If both factors exert influence upon the growth, their sum equals 1 (or 100 %).

Productive services of their own nature (suitable selection of profession, acceleration of professional preparation, acquirement of higher-level innovation skills, extension of the period of their acquirement and application, enhancement of the effectiveness of their application) lead to the enhancement of intensive factors influence. Technically speaking, they are the growth factor that enhances intensification, which makes it quite a distinct intensive factor.

The development of intensity and extensity of the world development from the beginning of our era is shown in the upper graph. It clearly demonstrates that a significant arrival of intensive factors corresponds to the period of industrial revolution. By that time, the development had been quite moderate, so the significance of dynamic parameters was markedly smaller with this tiny product growth. This development came close to a purely extensive development.

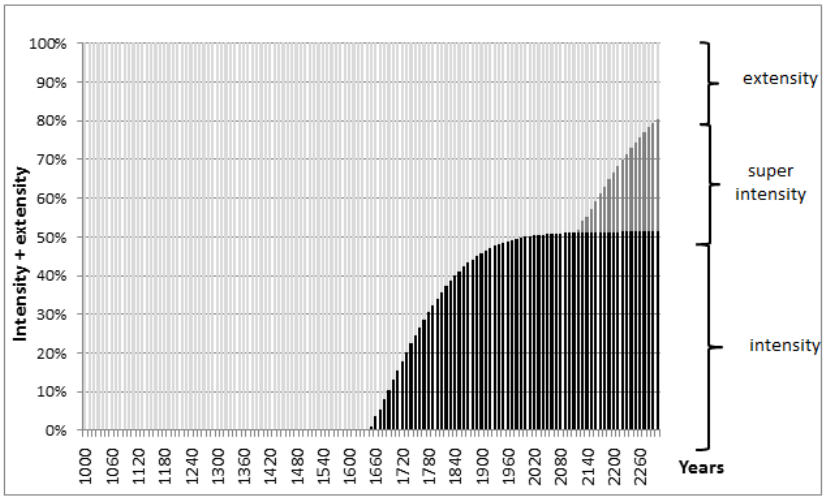


Figure 9: The Input of Human Skills

(Source: Mihola, Valenčík)

The input of human skills that "are recast" within a technical progress is the factor of intensive growth and we can express it and even imagine. Productive services intensify the process of overall utilization of human faculties (through their effective acquirement, better maintenance and application) and affect the intensification of the intensive factor. Future breakdown of the portion of extensive, intensive and super intensive growth factors may take the form presented in the Figure 9.

4. CONCLUSIONS

We live in times where problems and conflicts accumulate and arise for various reasons. Their common feature is the fact that the steady development of our civilization has run into natural barriers created by the nature of the world we live in. Overcoming these barriers and finding solutions to these problems requires a change of the economic growth nature as we have tried to demonstrate. This change is not only necessary but – which is most important – even possible. This change can be described, defined and named differently. We believe that its most distinct feature is substantial growth in role of productive services, i.e. services associated with acquiring, maintaining and applying human capital (education, health care etc.).

In order to implement this change, it is necessary to reform the systems of social investment and social insurance (education funding, health care, pension scheme) so that the society can activate mechanisms that create feedback between economic effects of productive services and sources of their funding. It is important to minimize or to completely exclude redistributed institutional interventions. Such mechanisms can be created by utilizing HCC based on transfer price and mediated application of the transfer price principle. This shall allow the sector of productive services to stand on its own economic foundation and active competition to contribute to substantial enhancement of their effectiveness. Effectiveness in this case means a higher-quality and more productive way of living.

Although the economic growth may not seem exponentially dynamic and sustainable, the analysis of industrial revolution (birth of industry, growth in its role in economy) and its comparison with distinct growth in role of productive services sector demonstrates the opposite, even with increasing dynamics of proportional gains.

Elaboration of the changes related to overcoming the steady nature of the development, specifically the form of growth in role of the productive services sector, is considered relevant and worth professional interest. Individual countries have different initial conditions. There might be different opinions concerning a number of questions, which is why problems arisen in this area should be tackled as part of international cooperation.

References

Barr, N., 2012, *Economics of the Welfare State*, 5th edition, Oxford University Press, Oxford.

Becker, G., 1993, *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*, 3th edition, The University of Chicago Press, Chicago.

Cyhelský, L, Mihola, J. &Wawrosz P, 2012,'Quality indicators of development dynamics at all levels of the economy', *Statistika (Statistic and Economy Journal)*, vol. 49, no. 2, pp. 29-43.

Grossman, H., 1972, ,On the Concept of Health Capital and the Demand for Health', *Journal of Political Economy*, vol. 80, no. 2, p. 223.

Grossman, H., & Herschel, I., 1998, *Human capital and predation: a positive theory of educational policy*, National Bureau of Economic Research.

Hájek, M., & Mihola, J., 2009, ,Analysis of total factor productivity contribution to economic growth of the Czech Republic', *Politická ekonomie (Political economy)*, vol. 57, no. 6, pp. 740-753.

Inglehart, R., 1977, The Silent Revolution, University Press, Princeton.

Johnstonoe, D., 1972, New patterns for college lending: Income contingent loans, Columbia University Press, New York.

Johnstonoe, D., 1986, Sharing the costs of higher education: Student financial assistance in the United Kingdom, the Federal Republic of Germany, France, Sweden, and the United States, College Entrance Examination Board, New York.

Johnstonoe, D., 2006, Financing higher education: Cost-sharing in international perspective, Boston College Center for International Higher Education, Boston.

Marx, K., 1973, Grundrisse, Penguine, London,

online http://www.marxists.org/archive/marx/works/download/Marx_Grundrisse.pdf

Marx, K., 1974, Rukopisy „Grundrisse" II, Svoboda, Praha.

Matějů, P., Schneider, O. & Večerník, J. 2003, Proč tak těžko...?, ISEA, Praha.

Matějů, P. & Simonová, N. 2005, České vysoké školství na křižovatce, Sociologický ústav, Praha.

Mihola, J., 2007, ,Aggregate Production Function and the Share of the Influence of Intensive Factors', *Statistika (Statistic and Economy Journal)* vol. 44, no. 2, pp. 108-132.

OECD, 2011, Health at the glance, Organisation for Economic Co-operation and Development, Paris.

OECD, 2011, Pensions at a Glance 2011, Retirement-Income Systems in OECD and G20 Countries, OECD Publishing, Paris.

OECD 2012,Health Data: Health expenditure and financing, OECD Health Statistics (database), Paris.

OECD 2013, Health: Key Tables from, OECD, iLibrary, Organisation for Economic Cooperation and Development. Paris.

Orszag, P. & Stiglitz, E., 1999, Rethinking Pension Reforms: Ten Myths about Social Security Systems, The World Bank, Washington.

Palacios, M., 2004, Investing in Human Capital, Cambridge University Press, Cambridge.

Radovan Richta & An Interdisciplinary Research Team, 1969, Civilization at the crossroads; social and human implications of the scientific and technological revolution , 3rd Edition , International Arts and Sciences Press 1969, UK.

Sörlin. S. &Vessuri, H., 2011, Knowledge Society vs. Knowledge Economy: Knowledge, Power, and Politics, Palgrave Macmillam, Hampshire.

Stehr, N. & Böhme, G., 1986, The Knowledge Society: The Growing Impact of Scientific Knowledge on Social Relations, Springer, Heidelberg.

Urbánek, V., 2007, Financování vysokého školství, Oeconomica, Praha.

Vossensteyn, J., 2009, ‚Challenges in student financing: State financial support to students, worldwide perspective', *Higher Education in Europe*, vol. 34, no. 2, pp. 183-199.